BRITISH COLUMBIA'S

REGIONAL SPECIAL WASTE STORAGE FACILITY SYSTEM

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INTRODUCTION

The Province of British Columbia's involvement with special (hazardous) wastes began in the late 1970's along with society's expanding awareness of environmental issues. In response partly to requests from the public to dispose of hazardous household chemicals and from the B.C. Ministry of Agriculture to dispose of large quantities of banned pesticides, the Ministry of Environment developed the Environmental Safety Program. As a component of the Waste Management Program, the Environmental Safety Program became responsible for overseeing the management of special wastes for all British Columbia.

In part, these duties now involve the management of small quantity special wastes which come from sources like hospitals, educational institutions, households, and some agricultural and commercial operations. Pesticides, solvents, acids, bases, and laboratory reagents are some of the more common small quantity special wastes the Program is requested to handle.

To meet this objective, the Ministry constructed eight "Regional Special Waste Storage Facilities" throughout the province in major population centres. At these facilities special wastes are received, sorted and kept securely until shipments are made to temporary storage or permanent disposal sites elsewhere.

FACILITY STAFF

Each Regional Special Waste Storage Facility is manned by an Environmental Safety Program Officer who carries out routine operations. These staff members have completed specific training programs, studying topics such as hazardous chemical safety, survival first-aid, the use and maintenance of respirators and fully encapsulating chemical resistant suits, oil spill control and dangerous goods management.

GENERAL OPERATIONS

Special wastes are usually received by appointment at a Regional Special Waste Storage Facility where they are identified, sorted, and relabelled and repackaged (if necessary). They are carefully packed in 205 litre steel drums according to particular chemical compatibility groups such as acids, bases, poisons and flammables. Vermiculite or other inert absorbents are also used to reduce the risk of spills and breakage.

PCBs are managed somewhat differently. Where a waste generator has a small quantity of waste containing PCBs, a regional storage facility may accept it only if sufficient storage space is available. This is necessary because at the end of April 1980,

the United States Environmental Protection Agency closed the American border to international shipments of PCBs. Now PCB wastes may only be securely stored, because no appropriate PCB disposal facilities exist in British Columbia or elsewhere in Canada.

Pathological, biological, radioactive, and explosive or National Fire Protection Association reactivity 4 rated special wastes are not handled at Regional Special Waste Storage Facilities. Pathological or biological wastes come under the jurisdiction of the B.C. Ministry of Health and are normally autoclaved before being placed in a solid waste stream or sewage system, or incinerated. Radioactive wastes, which come under the jurisdiction of both the Provincial Ministry of Health and the Federal Atomic Energy Commission, are most often shipped to the Federal Chalk River facility for storage. Explosives or reactivity 4 rated special wastes are accepted and destroyed by the Royal Canadian Mounted Police Explosives Disposal Unit.

While the operation of this small quantity special waste disposal system is provided free to householders and public institutions, the financial terms differ depending upon the volume of the waste handled. For small quantities of household special wastes, there are no fees. However, where volumes become significant, at half a 205 litre drum or more, a pro-rated charge for transportation and disposal is made. Should a commercial or industrial generator wish to dispose of a large quantity of waste, he is encouraged to deal with a commercial disposal agent or facility directly.

Since this system began in March 1978, nearly 20 shipments of special wastes have been made to disposal facilities outside B.C. Usually the destination has been a secure landfill in Arlington, Oregon, but recently treatment and disposal facilities in Ontario and Idaho have also been used. Shipments generally consist of 50-70 drums of special wastes. Loads are usually assembled in the Kamloops and Surrey Regional Special Waste Storage Facilities and shipments are made approximately one to three times a year.

CONSTRUCTION STANDARDS

Regional Special Special Waste Storage Facilities are typically constructed with explosion proof electrical supply and lighting, heating and superior ventilation systems, shower and eyewash safety equipment, and sealed floors to prevent loss and ease clean-up of any spilled materials. They comply with all Canadian, British Columbia, and local building codes. Complete construction standards are published in the Ministry of Environment's Procedure Manual and are reprinted in Appendix 1. The floor plan and photographs of a typical storage facility are included in Appendix 2.

FACILITY LOCATIONS

Situated in the interior of British Columbia, the Kamloops Regional Special Waste Storage Facility is a pivotal point in the system. Formerly used by the armed forces to store ammunition and explosives, it has been renovated to meet Ministry construction standards. The building has an area of 418 m^2 and is located in a growing industrial park, adjacent to the B.C. Ministry of Highways depot where forklifts an other mechanical equipment is available.

Because the Kamloops storage building acts as a staging area for shipments from the interior of the province, quantities of special wastes held in the remaining four interior locations (Penticton, Nelson, Prince George, and Smithers) are not large, and their space requirements are usually met by a floor area of 23 m^2. Regional Special Waste Storage Facilities are also situated in the most densely populated areas of the Province, in Victoria, Nanaimo (coordinating the Vancouver Island Region), and Surrey (for Vancouver and the Lower Mainland Region).

SITING FACTORS

Special attention was required in finding proper sites for these facilities. For example, locations within suitably zoned areas were always sought and obtained. In most cases the facilities were built close to regional Ministry offices in order to minimize transportation and handling of special wastes. As well, areas subject to flooding or in close proximity to surface waters were avoided.

CONCLUSION

The Ministry of Environment established its system of Regional Special Waste Storage Facilities to provide a secure, practical method for temporary storage of small quantities of special wastes. These wastes are managed by competent, trained personnel following safe handling procedures.

It should be emphasized that the volume of special wastes passing through these facilities is relatively small. The main purpose of the program is to provide a service to the public and to reduce the disposal of special wastes into the municipal refuse and sewage systems.

APPENDIX 1

MINIMUM CONSTRUCTION GUIDELINES FOR REGIONAL SPECIAL WASTE STORAGE FACILITIES

Minimum Construction Guidelines for Regional Special Waste Storage Facilities

This procedure replaces:

None.

Staff, Organizations directly affected:

Waste Management Branch.
Regional Operations Division.

Policy cross-references:

Volume 8 Section 7 Sub-section 04.01

Other cross-references:

British Columbia Buildings Corporation, Accomodation Manual, 1980.
Workers' Compensation Act, Industrial Health and Safety Regulations.
National Building Code (Canada).

Purpose:

A guideline for the construction of special waste storage facilities will ensure that Ministry staff are provided facilities which are of a similar nature and which meet current safety standards.

Definitions:

See glossary in Environmental Safety Program Procedures, Volume 8 Section 7 Sub-section 01.00.

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Minimum Construction Guidelines
for Regional Special Waste
Storage Facilities.

Procedure:

Ministry special waste storage facilities shall be constructed according to "Minimum Construction Guidelines for Regional Special Waste Storage Facilities," which appears in Appendix 1.

Appendix 1

MINISTRY OF ENVIRONMENT

MINIMUM CONSTRUCTION GUIDELINES

for

REGIONAL SPECIAL WASTE

STORAGE FACILITIES

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MINISTRY OF ENVIRONMENT MINIMUM CONSTRUCTION GUIDELINES FOR SPECIAL WASTE STORAGE FACILITIES

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1. INTRODUCTION

The Ministry of Environment is charged with the interim storage of special waste generated by the private sector, excluding major industrial generators. As these materials may pose a hazard, if improperly handled or stored, the Ministry has instituted Policies and Procedures as to training of staff in the receiving, packaging, shipping and storage of the materials. This paper concerns itself only with the storage facilities and affiliated components. Personnel are referred to the Waste Management Branch for policies affiliated with the operation of this facility.

1.1 BRITISH COLUMBIA BUILDINGS CORPORATION - RELATIONSHIP

The Ministry normally leases space from B.C.B.C. for a variety of purposes and would prefer to do the same for regional special waste storage facilities. The normal channels include identification of need by the region or branch, determination of the amount of space and preferred location, community approval costing, Treasury Board approval, and final construction or lease of the facility.

B.C.B.C. Accommodation Manual 1983-84.

2. APPROVALS

In addition to the internal approvals of the Ministry, and Treasury Board, this document has been reviewed by the Worker's Compensation Board and B.C.B.C. and their comments are incorporated into the body of the requirements. LOCAL CODES, National Building Code 1980, and W.C.B. REGULATIONS SHALL BE ADHERED TO IN CONSTRUCTION OF THE FACILITIES.

Ministry Procedure Manual,
Vol. 1, Sec. 1, Sub. 02.01

2.1 INTERPRETATION

References to the National Building Code or Worker's Compensation Board Industrial Health and Safety Regulations are made for informational purposes and are not intended to represent explicit interpretations (unless quoted directly); users of this material should, when interpreting material for the purposes of planning and/or construction, ensure that local authorities having jurisdiction provide the interpretation.

3. MINIMUM STANDARDS

It is expected that these guidelines may be revised, as the need arises; comments or suggestions should be forwarded to Waste Management Branch, on to the address shown on the title page.

4 SIZE

4.1 INTENT

Size of a particular facility is determined by the amount of materials to be stored. It is not the intent to provide facilities which are excessive to the need, nor any which do not fulfill the need. Since there is variation as to the amount of materials to be stored in any one region, the size of region's facilities will probably be different from one another.

4.2 DIMENSIONS

It is suggested that the facilities be basically rectangular, or a 2 X to 1 X ratio ie: twice as long as wide. Therefore a 200 sq. ft (19 m^2). facility would probably be 20 feet (6.1 m) long X 10 feet (3 m) wide. However variation is expected and is not cause for major concern.

4.3 MINIMUM SIZE

No facility of a free standing nature shall be less that 250 sq. ft. (23 m^2). Facilities included in another structure may be slightly smaller, but in no case shall be less than 200 sq. ft. (19m^2).

4.3.1 MAXIMUM SIZE

To be determined by local or regional demand, in consultation with Central Services.

4.4 MINIMUM HEIGHT

No facility shall be less than 8' (2400 mm) in height, measured from the floor surface to the lowest point of the material supporting the roof ie: timbers, beams, etc;

4.5 PARTITIONING

Partitioning shall be minimal, if at all, and in no case shall interfere with access or egress from the facility. Where provided the partitioning shall be of concrete block or similar material and shall extend floor to ceiling. Archways or openings in partitions shall not be less than 36" (914 mm) in width.

5 CONSTRUCTION ELEMENTS

5.1 WALLS AND FLOORS

Walls, floors and partitions (subject to 2.0) shall be of concrete block, smooth concrete finish, or all of one, or a combination of smooth concrete and block. Poured concrete, where used, shall have reinforcing material as an inherent part of the construction type.

5.2 CEILINGS AND ROOFS

Ceilings and roofs may be constructed using wood, plywood, or similar materials; joists shall be no less than 16" O.C. (400 mm O.C.) apart. Roofing materials shall be of good quality with no apparent cracks, or warpage. Ceilings shall be finished by means of two coats of oil base enamel paint (white in color); roofs shall be asphalt shingled or covered in other durable materials (fiberglass or metal.) Vinyl or rubber coverings are not acceptable.

National Building Code 1980 3.2.2.38(1)

5.3.1 BUILDING MATERIALS

In any case, subject to National Fire Code 5.9.1.1, all materials used shall have a fire resistance rating of at least 2 hours.

5.4 LOCATION

Facilities shall be conveniently located to allow access of various sizes of trucks; shall preferably be in a compound or otherwise adequately secured; may or may not be adjacent to other occupied structures, provided there is no hazard presented by the other facility. (see 5.5)

5.5 ADJACENCY

Facilities shall not be located immediately adjacent to office structures, where possible, and should not use common hallways, roof systems, building facades, or foundations; except that this may take place where these facilities are an integral part of the original building design.

National Building Code 1980 3.1.3.3(1) & (6)
Worker's Compensation Board 12.03(1)(a)

5.6 FINISHING

Finishing shall be of good construction quality and shall not have cracks, heaves, or uneven surfaces on any floor or wall surface.

5.6.1 FLOOR FINISH

Floors shall be of concrete materials and shall be coated with two (2) layers of epoxy resin paint on all floor surfaces and this finish shall extend from the floor surface a distance of no less than 6" (150 mm) up any wall surface, as measured from the floor level. The floor shall be constructed such that any material spilled on the floor shall flow to the trough or sumps described in 5.9.

5.7 DRAINS AND CATCH BASINS

5.7.1 DRAINS

Drains are not to penetrate the floor material anywhere inside the facility, except to provide waste-water drainage from the emergency eye wash/shower (see 15). No other drain, access, port or opening of any other kind is to be provided, on or through the floor, and every attempt shall be made to ensure the integrity of the flooring material. (See also 5.6, 5.6.1, 7, 5.7.2)

5.7.2 CATCH BASINS

A catch basin is to be supplied immediately below the emergency eye wash/shower (See 15) and shall be of builtup materials, preferably concrete (or concrete block and poured concrete,) or metal, and shall provide an area in which waste water from the shower and/or eye wash shall be primarily contained, to prevent contamination of other areas within the facility. The catch basin shall be painted with two coats of epoxy resin paint (See also 5.6.1). The catch basin shall drain to a sanitary sewer or holding tank (see also 15).

5.7.3 CATCH BASIN SIZE

The catch basin shall not be less than 2'8" (813mm) in length by 2'8" (813 mm) in width (measured to the internal edges of the catch basin) and shall provide, by means of grates, screens or other design alternatives, a stable surface on which workers may stand, when using the emergency eye wash/shower.

5.7.4 CATCH BASIN SILL HEIGHT

The catch basin sills are not to exceed 4" (100 mm) nor less than 2" (50 mm) in height, (as measured from the center of the catch basin) and shall be designed so as to divert water away from the trough described in 5.9.

5.7.5 CATCH BASIN LOCATION

The catch basin and emergency shower/eye wash shall be immediately adjacent to the primary exit from the facility.

5.8 LIPS (SILLS)

A lip of no less than 4" (100 mm) in height shall be placed across any access, egress, or any other portal which extends to ground level, such that the escape of spilled materials from the facility is prevented. The lip shall be continuous to the wall or floor material and shall be ramped to allow hand trolley access. The lip shall be of concrete construction.

5.9 TROUGH (SUMP)

A holding trough, sufficient in size to contain 45 imperial gallons (205 litres), shall be provided as an integral part of the floor construction and material. In no case shall this trough be connected to any drain of any sort. The slope of the floor shall be such to drain any material, except waste-water from the emergency eye wash/shower to the trough.

5.9.1 TROUGH COVER

A metal grate, grid, or cover, of sturdy construction, shall be supplied to cover the trough, to provide safe footing for personnel, and allow easy access for clean-out of any materials contained in the trough.

5.9.2 TROUGH FINISH

The trough shall be painted with two coats of epoxy resin paint.

5.10 MAN DOORS AND FRAMES

Man doors and frames shall be of sturdy construction and be metal; doors shall be painted with two coats of oil base enamel paint.

5.10.1 MAN DOOR SIZE

Man doors shall be no less than 36" (914 mm) in width, and 80" (203 mm) in height.

5.10.2 MAN DOOR INSTALLATION

Man doors shall be installed so as to be continuous to the building fabric, and shall swing out to egress.

5.11 OVERHEAD DOORS

Overhead doors, where approved, shall be no less than 7 ft. (2133 mm) in height, 8 feet (2438 mm) in width, and shall be metal.

5.11.1 OVERHEAD DOOR INSTALLATION

Overhead doors shall be installed so as not to interfere with the minimum clear ceiling height as required by section 4.4.

5.12 WINDOWS AND OPENINGS

Windows where provided may be used to provide natural ventilation; shall be no larger than 1/20th of any one wall surface; shall be located in the uppermost quadrant of any wall; shall be of good quality; and may open, but if so, shall be screened.

5.13 SCREENING

Other openings, except doors, where approved, shall be screened.

5.14 WINDOW AND OPENING COVERINGS

All windows and openings, except doors, shall be covered with expanded metal mesh to restrict access.

5.15 AWNINGS

Awnings may be supplied if appropriate to the buiding design or to aid in shading of the facility.

5.16 LIGHTING AND ELECTRICAL

All electrical supply shall be of good quality construction and shall be explosion proof.

5.16.1 LIGHTING LEVEL

A combination of natural and artificial light shall be supplied such that the lighting level shall be no less than 50 foot candles (500 LUX) at any time personnel are present in the facility. In addition, it is required that an exterior light be placed over the main entrance to the facility.

5.16.2 EMERGENCY LIGHTING

One (1) emergency light, sufficient in lux to allow egress from the facility, shall be supplied and installed, immediately above the primary exit, such that should the power supply fail, the emergency light becomes operational.

5.17 ELECTRICAL

No electrical outlets of any sort, for the use of hand held tools or items, shall be allowed internal to the facility, with the exception of that required for 5.16.1 and 5.16.2.

5.18 STATIC STRAPS

A grounding system, using bare copper wire mounted horizontally approximately 36 inches (920mm) above floor level, attached at 18 inch (450mm) intervals by mechanical clips, running the length of three walls (not including the wall with the door), and connected to an external ground rod shall be supplied. Two complete sets of "booster" cables shall be used to ground the barrels to the ground wire (use Canadian Tire 8 foot (2.4m) #4 gauge "Moto Master" part # 11 - 1216, or equivalent booster cables).

6 HEATING

Auxiliary heat shall be provided by such means that the temperature inside the facility is not less than 5° C (41° F) at any time of the year. Sufficient heating capacity shall be provided to allow the facility to be heated to 20° C (68° F), at any time of the year. Electrical heat supply shall conform to 5.16. (See also 6.2, Ventilation)

6.1 COOLING

Cooling shall not be provided, except by judicious positioning of the facility to take advantage of natural shade.

6.2 VENTILATION (WHEN OCCUPIED)

When occupied the facility shall use forced air ventilation so as to provide air exchange as identified below:

A two (2) inch (50 mm) slot exhaust generating 150 CFM per foot (30 mm) of exhaust mechanism shall be provided, no less than 5 feet (1524 mm) in length above the bench or benches (See 14); the total exhaust air provided at the bench or benches not to be less than 750 CFM anytime personnel are present in the facility. Make-up air is to be tempered to 20° C (66°F), (when occupied) and shall provide the same capacity of volume as the exhaust air, either at idle speed or full speed. The ventilation system shall be integrated with the lighting switching, so that when the lights are switched on, the ventilation sets up to its highest level, but shall run at its lowest level when the lights are off. (In the event of power failure, the system resets itself to lowest level).

6.3 VENTILATION WHEN NOT OCCUPIED: IDLE VENTILATION

The facility shall be constantly ventilated, at one half the rate of cubic feet per minute identified in 6.2, at any time personnel are not present in the facility, and shall be not less than this rate, at any time. In any case, no less than 1 CFM/sq. ft. of facility shall be exhausted at idle level.

6.3.1 VENTILATION TEMPERATURE AT IDLE

The temperature, at idle level of ventilation, shall be maintained at no less than 5°C (41°F). (See also 6).

7 WATER SUPPLY

A water supply shall be provided for the facility internal to the structure to provide water for an eye wash and shower. The water supply shall be sufficient to provide a constant flow of 40 gallons per minute for no less than 15 (fifteen) minutes from either the shower or the eye wash, as required and controlled by the personnel using the shower or eyewash. Water temperature shall be no more than 32° C (90° F) nor any less than 15° C (60° F). Water resulting from use of the eye wash and/or shower may be drained to sanitary sewer or equivalent or to a holding tank. In no case shall this water be diverted to the catch basin identified in 5.7. A hose bib, mounted externally to allow clean up of trucks etc. may be supplied. (See also 15, Eyewash/Shower)

Worker's Compensation Board
12.05

8 FIRE PROTECTION

Fire protection equipment shall be supplied by means of one (1) ABC rated fire extinguisher (20 lb) per facility and shall be wall mounted, convenient for use. Sprinklers or other water based extinguishers are not to be provided.

8.1 FIRE ALARMS

Fire alarms as required by municipal, provincial or federal authorities having jurisdiction shall be supplied.

8.2 FLAMMABLE STORAGE LOCKERS

One (1) 45 gallon (205 l) flammable storage locking cabinet (ULC or CSA Approved, Fleck Bros. HW 45 or equivalent) shall be supplied and installed and vented externally to the facility. Forced ventilation is not required for flammable storage lockers.

9 TELECOMMUNICATIONS

Conduit shall be provided to allow installation of a wall mounted single line telephone, external to, and immediately adjacent to the primary exit and shall be operational 24 hours per day. The telephone shall be mounted in a weather-proof enclosure.

10 BULLETIN BOARDS

A bulletin board of no less than 12 inches (300 mm) X 24 inches (610 mm) shall be mounted immediately adjacent to the main access door (if more than one) inside the facility, and shall be not less than 48 inches (1219 mm) from floor level, nor more than 60 inches (1524 mm) from floor level.

11 PLACARDING

Placarding or signs shall be provided by the Ministry and shall be mounted in a conspicuous location in a permanent fashion.

Worker's Compensation Board 12.07(2)(a)

12 LOCKERS

Lockers for the storage of protective clothing and equipment shall be provided immediately adjacent (but preferably inside of) to the facility and shall be metal. No less than one (1) locker, 12 inches (300 mm) wide, by 72 inches (1828 mm) High X 12 inches (300 mm) deep shall be provided for every 100 sq. ft. (9.3 m^2) of facility, to a maximum of 4 lockers in any one facility.

Worker's Compensation Board 12.07(2)(c)

13 COMPOUNDS

In accordance with 5.4 and 5.5, the facility shall be located within a compound, whenever possible. The compound may be shared use.

13.1 STORAGE PEN

An area for storage of empty special waste containers may be provided and, if so, shall be immediately adjacent to the facility, and shall be rain and snow sheltered. The storage pen, if supplied, shall be fenced in accordance with 13.2. Access to the storage pen shall be by means of a gate no less than 48 inches (1219 mm) in width and shall be the same height as any fencing.

13.2 FENCING

Storage pens shall be fenced, using good quality chain link fence to a minimum height of 7 feet (2133 mm) and shall have barbed wire strands filling any gap between the fence and the rain shelter (13.1), or shall be fenced to the height of the rain shelter.

13.3 ACCESS TO COMPOUNDS

Compounds shall be accessed by means of a gate, or pair of gates, no less than 8 feet (2438 mm) in width and the same height as the rest of the compound fence. Curbs shall be ramped to allow use of hand trolleys, fork lifts or similar equipment.

14 BENCHES

A work bench, shall be provided, and shall conform to the following; Work benches shall be no less than 72" (1828 mm) in length, 30" (760 mm) in width, and 36" (914 mm) in height, and shall have a topping material of one of the following (Canlab Specifications, or equivalent): Epoxy resin, colorlith, colorceran, imperial stone; epoxy resin preferred. One or two drawers for storage of labels and papers is also suggested as part of the work bench.

15 EMERGENCY EYE WASH AND SHOWER

One (1) emergency safety shower (over head) and eye wash facility, shall be supplied and installed (see also 5.7 and 7). The safety shower and eye wash shall conform to ANSI standards Z 358.1 - 1981.

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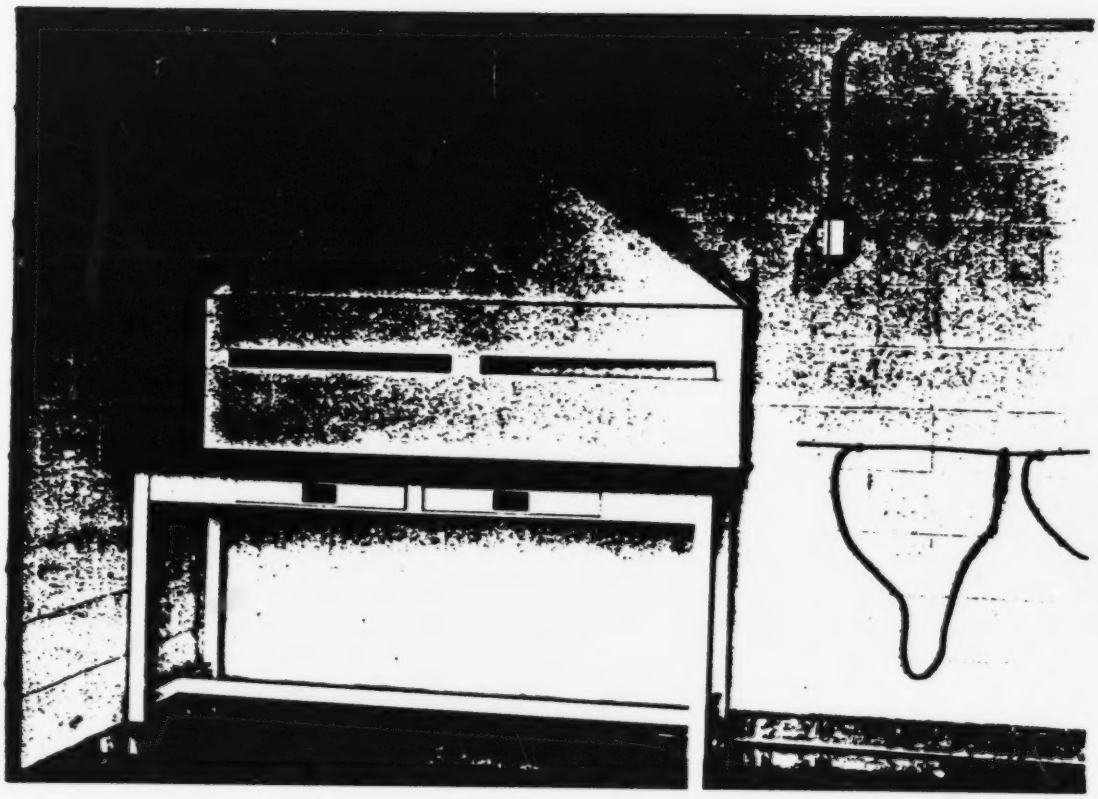
APPENDIX 2

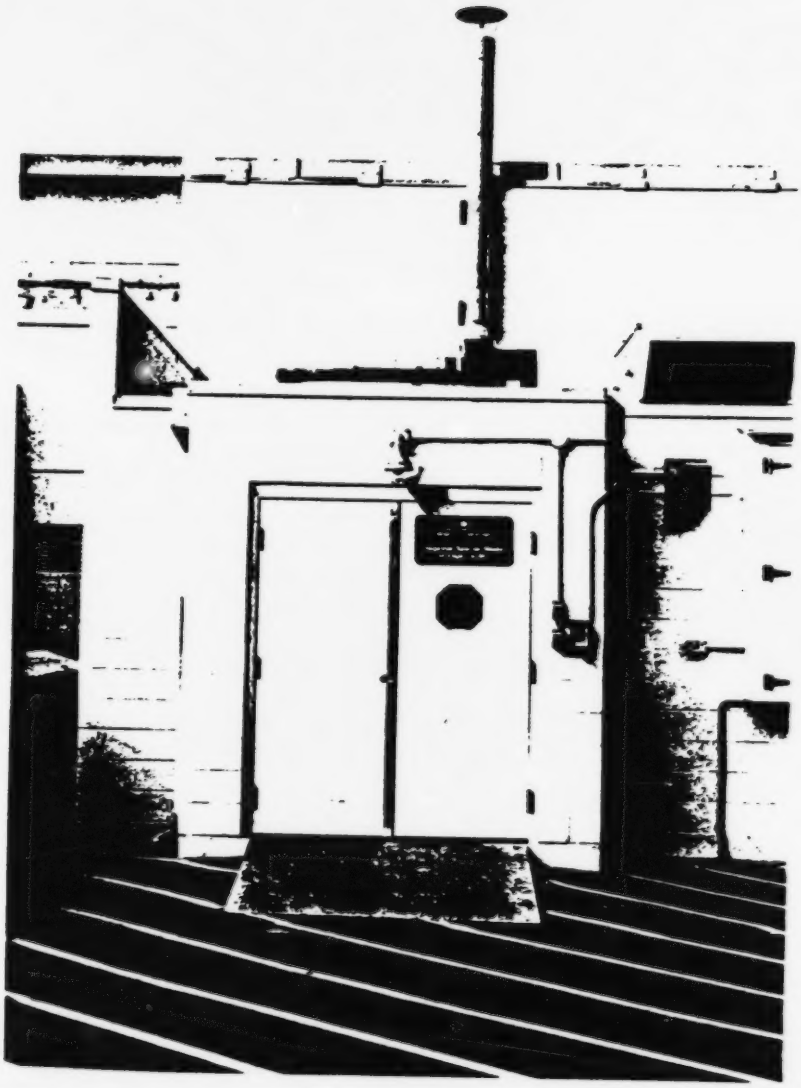
PHOTOGRAPHS AND FLOOR PLAN OF A TYPICAL REGIONAL SPECIAL WASTE STORAGE FACILITY

Figure 1



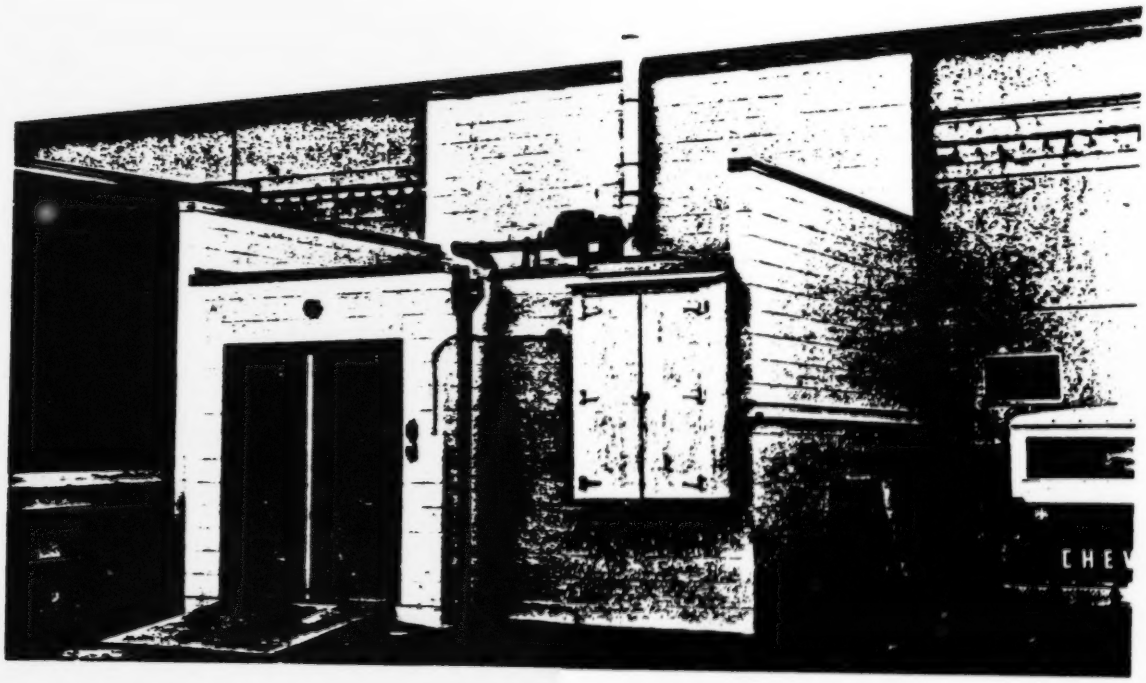
View of the slot exhaust mechanism (guideline item #6.2 showing the work bench with epoxy resin top (guideline item #14). Note the static strap system (guideline item #5.18) to the right of the work bench. Saanich Facility.

Figure 2



Partial view of the Saanich facility, showing the placarding (guideline item #14); to the right of the placarding are the controls for the lighting and ventilation, as well as the fire alarm. The cross hatching in the foreground prevents parking in front of the facility. Note the ramped access. It is duplicated inside the facility.

Figure 3

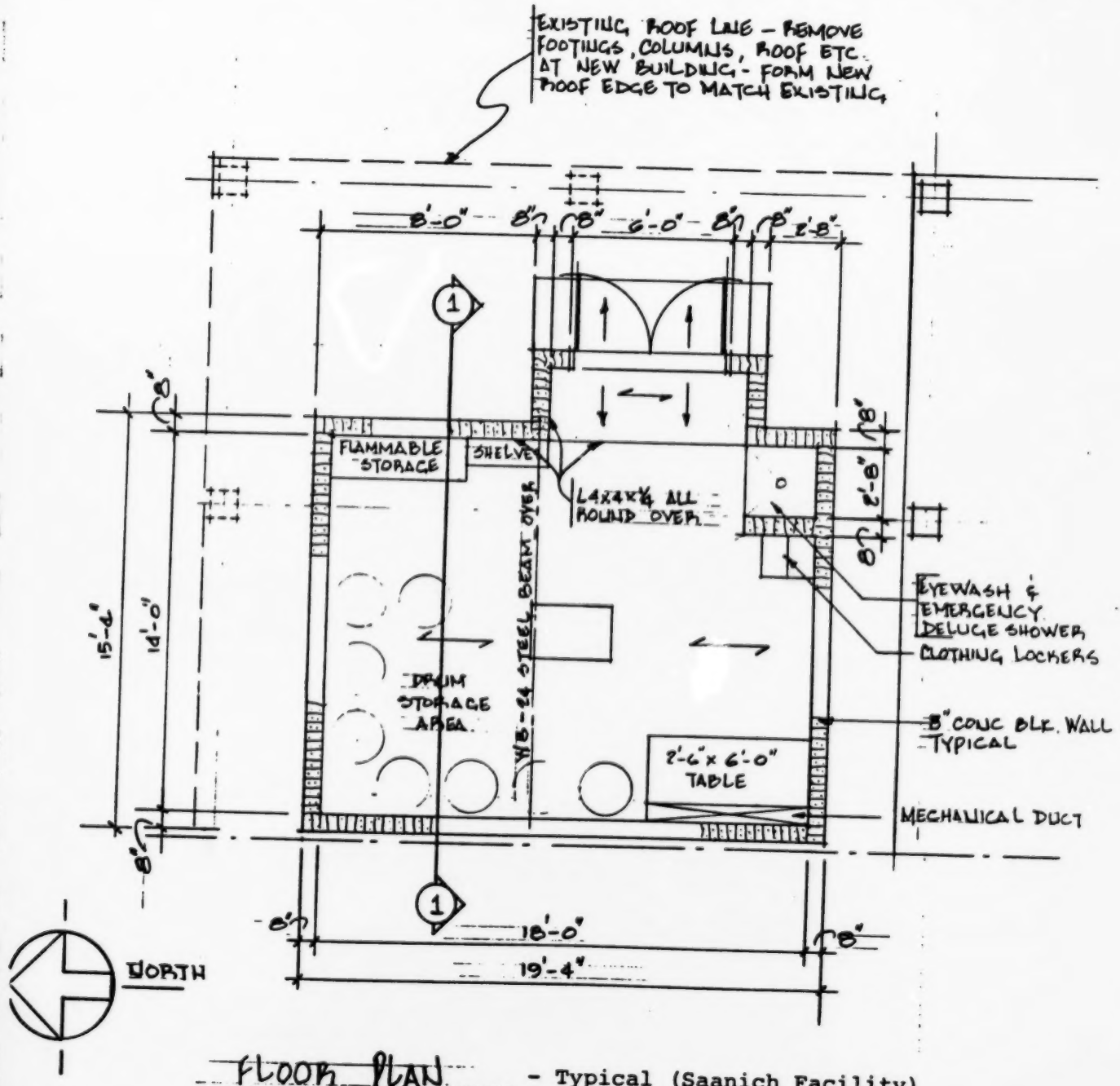


View of the partially completed Saanich facility. The ventilation system is mounted externally on the roof of this facility, while in most others, the ventilation system is internally mounted, because of weather conditions. The truck gives some idea of overall size.

Figure 4

A view of the Saanich facility showing the work bench, lighting, static straps, and in the lower foreground, a partial view of the trough (guideline item #5.9), covered by checker plate. The dark grey material on the floor is the epoxy resin paint (guideline item #5.6.1).

Figure 5



FLOOR PLAN - Typical (Saanich Facility)

SCALE 1/4" = 1'-0"

SEE SHEET # 2 FOR SITE PLAN